Central Florida Water Initiative

WATER FOR TOMORROW

DRAFT

SCOPE OF WORK (SOW)

ENVIRONMENTAL MEASURES TEAM

Revision 0.3

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Purpose

The Environmental Measures Team (EMT) will conduct a comparative evaluation of wetland stress for Class II isolated wetlands within the CFWI project area. Using a CFCA study of 400 wetlands conducted around 2008, the EMT identified approximately 250 isolated wetlands that were non-confounded and were suitable for analysis as stressed or non- stressed. It should be noted that not all of the originally identified wetlands may be available for inclusion into this study. Instances of precluded access or development pressures may prohibit current or future access and may therefore necessitate flexibility in wetland selection. The underlying goal of this analysis is to ascertain whether previous findings of wetland stress have remained constant or have changed. If a statistically valid portion of the original sample pool has deviated from the initial finding then the sample pool may increase up to and including the entirety of all wetlands included in the original analysis. If no significant change is noted – then accordingly there is no need to revise the original statistical projections relative to model correlations.

Only wetlands previously identified as Stressed or Non-stressed will be evaluated to determine if there has been any change of status. Specific measures were developed for classifying wetlands and it is the intent to employ the same measures to evaluate current wetland stress. Selection of a statistically valid sample pool of Stressed and Non-stressed wetlands will be made. A GIS screening-level analysis will initially be used to determine if the selected wetlands are available for additional consideration. EMT members will visit selected wetlands and the criteria previously used to ascertain wetland stress applied. Data collection forms will be used by team members to record observations for each wetland visited. Through the application of the original wetland stress criteria, a determination will be made as to the current wetland stress, which will result in a finding of Stressed or Non-stressed.

It is possible there may be changes from the original field observation findings of Stressed or Non-stressed. In the event that there is substantive (either as a percent of total population or concentrated groupings) change in wetland stress, then the EMT will reformulate its strategy.

Revision History

Revision Date	Version	Changes
10-20-16	0.1	First draft provided for consideration and change
10-27-16	0.2	First revisions made
11-1-16	0.3	Second revisions made

INTRODUCTION/BACKGROUND

The CFWI Steering Committee tasked the EMT with using the available wetland information to develop a risk-based predictive tool to estimate future occurrence of wetland stress in response to predictions of ground water level alterations from the ECFT model. Given that the groundwater model is best able to predict changes in hydrology in isolated wetlands, the EMT focused on assessing the relationship between changing water levels and the occurrence of stress in isolated wetlands.

Wetlands were identified as being stressed if they were observed to have any one of the following characteristics:

- A multi-decadal trend of decreasing water levels seen on historic aerial photography. Trends were: a downslope migration of upland vegetation, a decrease in the aerial extent of the wetland, a shift from emergent vegetation (obligate wetland species) to long-lived woody vegetation (facultative species), diffusion of the transitional zone between upland and wetland plant communities, and the establishment of upland trees in historic wetland area.
- Absence of hydrologic indicators observed during field assessments in wetlands where hydrologic indicators should be present (e.g., lichen lines that extend to the soil surface).
- Evidence of permanently reduced wetland water levels or invasion/establishment of species from drier communities.
- Soil oxidation or loss (due to reduced water levels) observed during the field assessment in wetlands that had organic soils. In forested systems, this was typically linked with an excessive number of leaning or falling trees.

The remaining indicators were used as supporting information where hydrologic stress was determined by the above characteristics.

The term "stress" as defined by the EMT should not be confused with ecological "stressors". For example, periodic extreme hydrologic conditions driven by climate (drought and flooding events) are stressors that act to shape the ecological characteristics of wetlands. These events, including occasional extreme droughts, can be essential to the overall health of select wetlands. Transient stress resulting from extreme or prolonged drought can lead to the invasion of upland vegetation into wetlands (particularly herbaceous species such as dog fennel) and the establishment of a new age class of tree seedlings and saplings. Extreme drought also limits the upslope extent of hydric organic soils by oxidation and compaction processes. Nevertheless, these changes are largely reversible over several years and are considered as a natural aspect of wetland ecology. In fact, periodic extreme droughts are necessary for many important wetland trees and shrubs, allowing periodic recruitment of seedlings into the population. In addition, periodic extreme flooding events, such as those associated with tropical cyclone events, tends to eliminate transient upland vegetation from the wetland footprint. All wetlands undergo these subtle shifts in vegetation with climatic variability.

Roughly 250 wetlands were considered by the EMT. Two general wetland classifications were made at that time. The wetlands were 1) Stressed; or 2) Non-stressed; Confounded wetlands and contiguous wetlands were excluded from further consideration. Confounded wetlands were typically degraded from drainage induced by ditching, or in some cases, altered by groundwater mounding from Rapid Infiltration Basin Systems (RIBS).

Confounded wetlands were excluded for one or more of the following reasons: 1) wetlands were physically altered to an extent that their hydrologic characteristics were likely to have been affected, 2) vegetation communities were highly impacted by plant management activities such as herbicides, mowing, etc. 3) regulation schedules on water bodies caused hydrologic change, or 4) significant basin alterations were present.

Following the initial data collection, the EMT produced a Final Report summarizing the results of the data and predictive extrapolations of potential wetland stress as a result of hypothetical groundwater level changes..

The EMT sorted wetland sites into three broad classes, based on the types of information available at each site, as shown in the below table.

- Class 1 includes 44 wetlands that were studied in detail, have known hydrologic conditions (water level variability and wetland edge elevation), and have been assessed to determine whether they are currently stressed or non-stressed.
- Class 2 consists of 313 sites where the environmental condition of the wetland is known, but there is insufficient water level data to classify their hydrologic conditions.
- For most of the remaining thousands of isolated and hydrologically unaltered wetlands in the region (Class 3), neither the water levels nor the stress conditions were known.

Wetland Data Class	Data Class Characteristics		
	Wetland Type	**Current Stress Condition**	**Water Level Hydrograph**
Class 1	Known	Known	Known
Class 2	Known	Known	Unknown
Class 3	Known	Unknown	Unknown

Using the Class 1 data set of 44 wetlands, statistical analyses were performed to develop a relationship for the likelihood of stress as a function of water levels. The ECFT groundwater model was used to assess the likely amount of future change in groundwater levels under various model scenarios. The statistical relationship for risk of wetland stress as a function of water levels was then used to estimate the probability that any given wetland would change stress status as a result of future projected changes in groundwater levels.

For the Class 1 wetlands, it was possible to estimate a site-specific probability that a wetland would change stress status based on its own site-specific history of water levels and projected future changes in those levels. For Class 2 wetlands, the historical range of water levels at each wetland was unknown, but the current stress status was known. It was thus possible to calculate a population-weighted average risk of stress status change by assuming that the statistical distribution of historical water levels can be estimated from those observed in Class 1 wetlands.

SCOPE OF WORK/SCOPE STATEMENT

The EMT will compare the original determination of wetland stress, which was defined approximately 10 years ago, to current findings of wetland stress to ascertain if there has been change. This project will select a statistically valid sample of Class 2 wetlands to compare findings of wetland stress as made by the CFCA with wetland stress today. All wetlands involved in the stress analysis are part of the CFCA dataset and no new wetlands will be added to the study.

A representative set of stressed and non-stressed wetlands will be selected from the existing CFCA dataset. The selection process will include the following: 1) Selection of a statistically sound sample pool; 2) Verification that the intended wetland exists (i.e., not developed) and is still not confounded; and 3) Verification of site access. EMT personnel will verify if the selected wetlands are available for current consideration, and if not, an alternative existing Class II wetland will be used.

Coordination meetings involving EMT personnel and other interested parties will be scheduled as the project progresses for information dissemination. Information gathered for the project will be summarized and reports generated to document findings.

If there is a statistically significant change in the percentage of stressed wetlands, then additional data collection may be appropriate to confirm findings. This might involve an intensive evaluation of surrounding land uses, regulatory permitting actions, localized weather aberrations, or other related factors that may affect the classification. If a statistically significant change in the percentage of stressed wetlands is found, the EMT will present recommendations on any further work required to respond to the findings.

KEY PROJECT ACTIVITIES

Project Initiation/Planning:

- Ascertain technical support requests poised by other CFWI teams.
- Develop SOW relative to support needs

Design Phase:

- Determine a statistically valid sample pool
- Coordinate with WRAT/MOC for verification/approval of proposed sample size
- Conduct screening-level analysis for potential Class II wetlands

Implementation Phase:

- Schedule joint meetings of EMT members and participants
- Schedule joint field work by EMT members
- Begin correlation between previously established wetland stress and current determination
- Develop preliminary reports documenting findings

Transition and Close:

- Consolidate data findings and develop report for consideration

SCHEDULE/MILESTONES

Milestones	End Date
SOW Release	December 1 2016
Screening Analysis, Select Sites determining the correct sample	February 15 2017
Data Review for Stress Variance	March 15 2017
Data Collection determining the correct sample	June 15 2017
Preliminary Report	July 1 2017
Data Summarization, Report Generation	August 15 2017
Project Closure	September 1 2017